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SPECIFICATION

HEAT SINK CLIP WITH PRESSING POST

BACKGROUND OF THE INVENTION

1. Field of the invention

[0001] The present invention relates to securing of heat sinks to electronic packages; particularly to a heat sink clip capable of providing an adaptable compressing force applied to a heat sink for securely and readily retaining the heat sink to an electronic package, and a heat sink assembly employing such a heat sink clip.

2. Related art

[0002] In order to reduce heat produced by high-speed computer Central Processing Units (CPUs) such as the Pentium IV produced by Intel(R) and the K8 produced by AMD(R), bigger and heavier heat sinks are becoming increasingly necessary. Strong resilient clips are often used to attach these heat sinks onto electronic packages.

[0003] An example of this kind of heat sink clip is disclosed in Taiwan patent publication No. 456586. The clip is usually integrally formed from a sheet of plastic or steel. The clip comprises a central pressing portion, and two resilient portions extending outwardly and upwardly from opposite sides of the pressing portion. Two locking portions depend from distal ends of the pressing portion, respectively. A locking hole is defined in each locking portion. In operation, the locking holes of the clip are lockably engaged with catches of a CPU socket. The pressing portion of the clip is deformably attached to a surface of a heat sink for

securing the heat sink to a CPU mounted on the socket. Thus a resilient compressing force is applied to the heat sink by the clip. However, the resilient compressing force is invariable because it is provided only by the deformation of the clip. Therefore the clip lacks adaptability for use in various applications having different force requirements. Furthermore, the resilient compressing force tends to diminish over time due to fatigue.

BRIEF SUMMARY OF THE INVENTION

[0004] Accordingly, an object of the present invention is to provide a heat sink clip which is durable, and which is capable of providing an adaptable compressing force for securely attaching a heat sink to an electronic package in a variety of applications.

[0005] Another object of the present invention is to provide a heat sink assembly employing the above-described heat sink clip.

[0006] To achieve the above-mentioned objects, a heat sink clip of a preferred embodiment for attaching a heat sink to a CPU mounted on a socket comprises a main body, a post, and a spring. The main body comprises a longitudinal portion, and first and second locking arms extending downwardly from opposite ends of the longitudinal portion. The longitudinal portion defines a through aperture therein. Two hooks are respectively formed at free ends of first and second locking arms for engaging with catches of the socket. The post has a pressing portion at a bottom thereof for being fittingly received in a mating portion defined in the heat sink. The post extends through the through aperture of the longitudinal portion. The spring is arranged around the post and between the pressing portion and the longitudinal portion of the main body.

[0007] A heat sink assembly in accordance with the present invention

comprises a heat sink having a mating portion defined therein, a support module having first engaging means, and a clip. The clip comprises a main body, a post, and a spring. The main body comprises a longitudinal portion, first and second locking arms extending downwardly from opposite ends of the longitudinal portion. The longitudinal portion defines a through aperture in a middle thereof. Two hooks are respectively formed at ends of the first and second locking arms to engage with the first engaging means of the support module. The post has a pressing portion at a bottom thereof for being fittingly received in the mating portion of the heat sink. The post extends through the through aperture of the longitudinal portion. The resilient element is disposed around the post below the longitudinal portion.

[0008] Other objects, advantages and novel features of the present invention will be drawn from the following detailed description of the present invention and claims together with the attached drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Fig. 1 is an exploded, isometric view of a heat sink assembly in accordance with the present invention together with a central processing unit (CPU), with part of a heat sink of the heat sink assembly cut away;

[0010] Fig. 2 is an exploded, isometric view of a heat sink clip of the heat sink assembly of Fig. 1;

[0011] Fig. 3 is an assembled view of Fig. 1, with another part of the heat sink cut away; and

[0012] Fig. 4 is an exploded, isometric view of a heat sink clip in accordance with an alternative embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0013] Referring to Fig. 1, a heat sink clip 20 in accordance with the preferred embodiment of the present invention is used to press a heat sink 10 onto a CPU 60 mounted on a socket 50. The heat sink clip 20 comprises a main body (not labeled), a post 26, and a spring 27.

[0014] The heat sink 10 comprises a base 12, and a plurality of fins 14 extending upwardly from the base 12. A channel (not labeled) is defined in a middle of the heat sink 10. A blind hole 16 is defined in a top surface (not labeled) of the base 12 in the channel. The socket 50 forms two catches 52 at opposite sides thereof respectively, corresponding to opposite ends of the channel of the heat sink 10.

[0015] Referring to Fig. 2, the main body of the clip 20 comprises a longitudinal portion 31, and a first locking arm 32 and a second locking arm 24. The first locking arm 32 integrally extends downwardly from a first end of the longitudinal portion 31. The second locking arm 24 is detachably fixed to and extends downwardly from an opposite second end of the longitudinal portion 31. A through aperture 36 is defined in a middle of the longitudinal portion 31. The second end of the longitudinal portion 31 is bifurcated, thereby forming two barbs 34. The second locking arm 24 comprises a handle 42 at an end thereof. A hole 45 is defined in the second locking arm 24, for lockably receiving the barbs 34 of the longitudinal portion 31. Two hooks 38, 46 are respectively formed at free ends of the first and second locking arms 32, 24.

[0016] The post 26 comprises a main shaft 49, a head 48 at a top of the main shaft 49, and a pressing end (not labeled) at a bottom of the main shaft 49 for pressing the base 12 of the heat sink 10. Preferably, the pressing end of the post 26 is enclosed with a cap 28 in order to provide an enlarged pressing area. An

outer diameter of the cap 28 is greater than a diameter of the main shaft 49 of the post 26, and is also greater than a diameter of the spring 27. A diameter of the through aperture 36 of the longitudinal portion 31 is slightly greater than that of the main shaft 49 of the post 26, and less than that of the spring 27.

[0017] Referring back to Fig. 1, in assembly the heat sink clip 20, the post 26 is extended downwardly through the through aperture 36 of the longitudinal portion 31. The spring 27 is disposed around the post 26 below the longitudinal portion 31. The cap 28 is inferentially engaged with the pressing end of the post 26, so that the spring 27 is held between the cap 28 and the longitudinal portion 31. The barbs 34 are lockingly engaged in the hole 45 of the second locking arm 24.

[0018] Referring also to Fig. 3, in use of the heat sink clip 20, the heat sink 10 is placed on the CPU 60 that is mounted on the socket 50. The heat sink clip 20 is placed in the channel of the heat sink 10. The cap 28 is fittingly received in the blind hole 16 of the base 12 of the heat sink 10. The hooks 38, 46 of the first and second locking arms 32, 44 are resiliently engaged with undersides of the catches 52 of the socket 50 respectively. The spring 27 is thereby compressed, and urges the longitudinal portion 31 upwardly while simultaneously urging the cap 27 downwardly to press the heat sink 10 against the CPU 60. The heat sink 10 is thereby securely attached to the CPU 60.

[0019] In disassembly of the heat sink clip 20 from the socket 50, the handle 42 is pressed downwardly so that the hook 46 disengages from the corresponding catch 52 of the socket 50. The clip 20 is then easily taken out from the heat sink 10.

[0020] Referring to Fig. 4, a heat sink clip 20' in accordance with the alternative embodiment of the present invention comprises a main body (not labeled), a post 26', and a spring 27'. The main body comprises a longitudinal portion 31', and a first locking arm 32' and a second locking arm 24'. The first

locking arm 32' integrally extends downwardly from a first end of the longitudinal portion 31'. The second locking arm 24' is detachably fixed to and extends downwardly from an opposite second end of the longitudinal portion 31'. A through aperture 36' is defined in a middle of the longitudinal portion 31'. The post 26' comprises a main shaft 49', a head 48' at a top of the main shaft 49', and a pressing end (not labeled) at a bottom of the main shaft 49'. A thread (not labeled) is formed on a circumferential periphery of the pressing end. In assembly, the pressing end of the post 26' is threadedly engaged with a cap 28' in order to provide an enlarged pressing area. The cap 28' is fittingly received in the blind hole 16 of the heat sink 10 (see Fig. 1).

[0021] It is understood that the invention may be embodied in other forms without departing from the spirit thereof. Thus, the present examples and embodiments are to be considered in all respects as illustrative and not restrictive, and the invention is not to be limited to the details given herein.